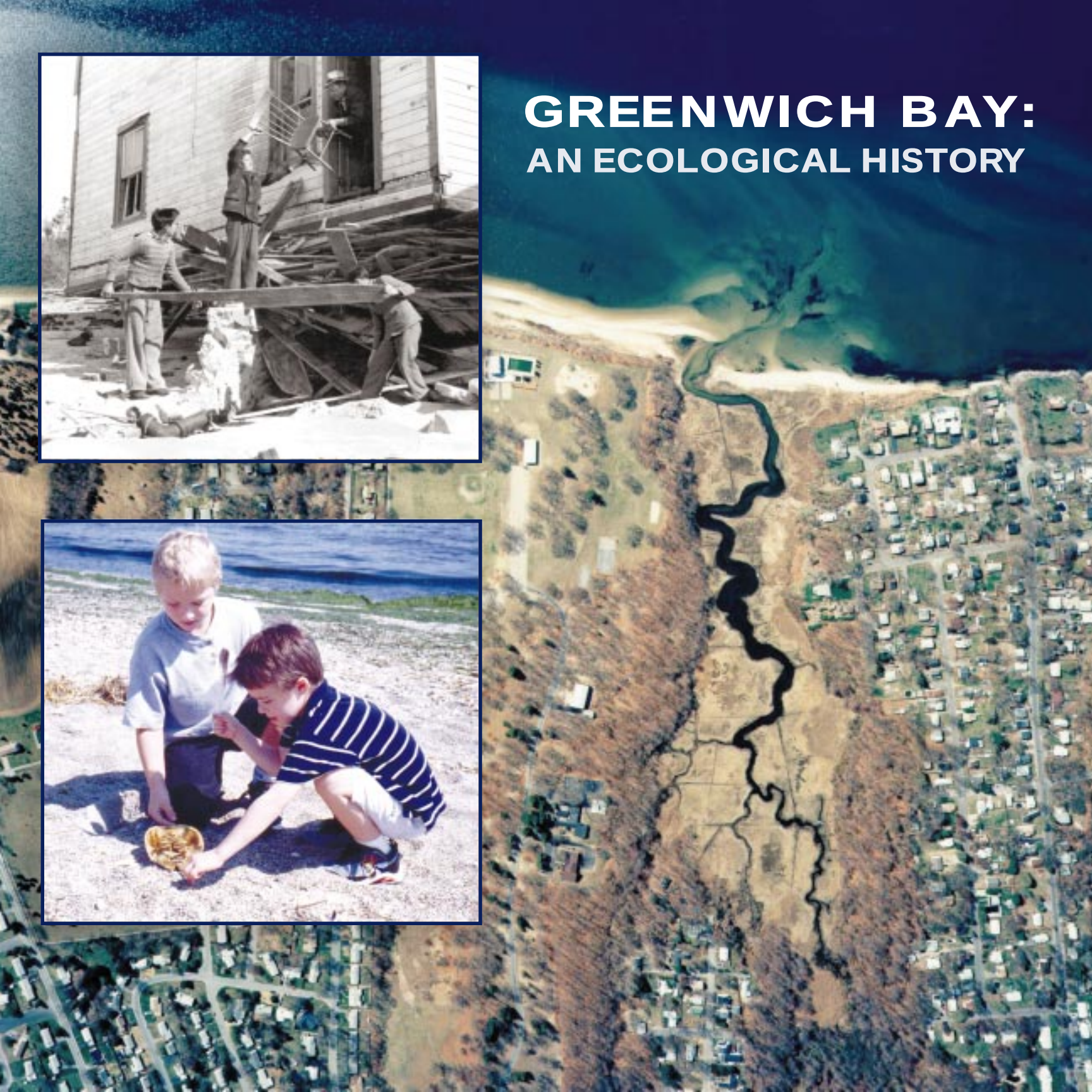


GREENWICH BAY: AN ECOLOGICAL HISTORY



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20, (Scalettown, East Greenwich, R.I., c. 1930, artist-Avery Lord, Safety negative, Neg. no., RHi X3 6718), 23, (Two Fishermen on Shore with Clams, Rake and Basket,

September 4, 1930, artist-Avery Lord, Glass negative, Neg. no. RHi X3 9276).

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Photos by Monica Allard Cox: pp. 5 (boat, shellfisherman, and researcher), 9, 11 (Arthur Ganz), 20, 26 (boat), 27 (restaurant), 29 (marina).

Photos by Charlie Festa: pp. 8 (pipe), 28, 29 (quahog).

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Puffin Enterprises: Inside covers, pp. 22 (schooner), 23 (Oakland Beach Draw Bridge postcard, published by David H. Berry, Oakland Beach, R.I.), 24 (waves), 25 (Warwick

Lighthouse postcard, published by The Hugh C. Leighton Co., Portland Maine), 29 (Nock's Shipyard, East Greenwich, R.I., postcard, published by Morris Berman, New Haven, Conn.), 32 (Yacht Club, Oakland Beach, R.I., postcard, published by F.E. Booth, Oakland Beach, R.I.).

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GREENWICH BAY: An Ecological History

By Sue Kennedy and Virginia Lee

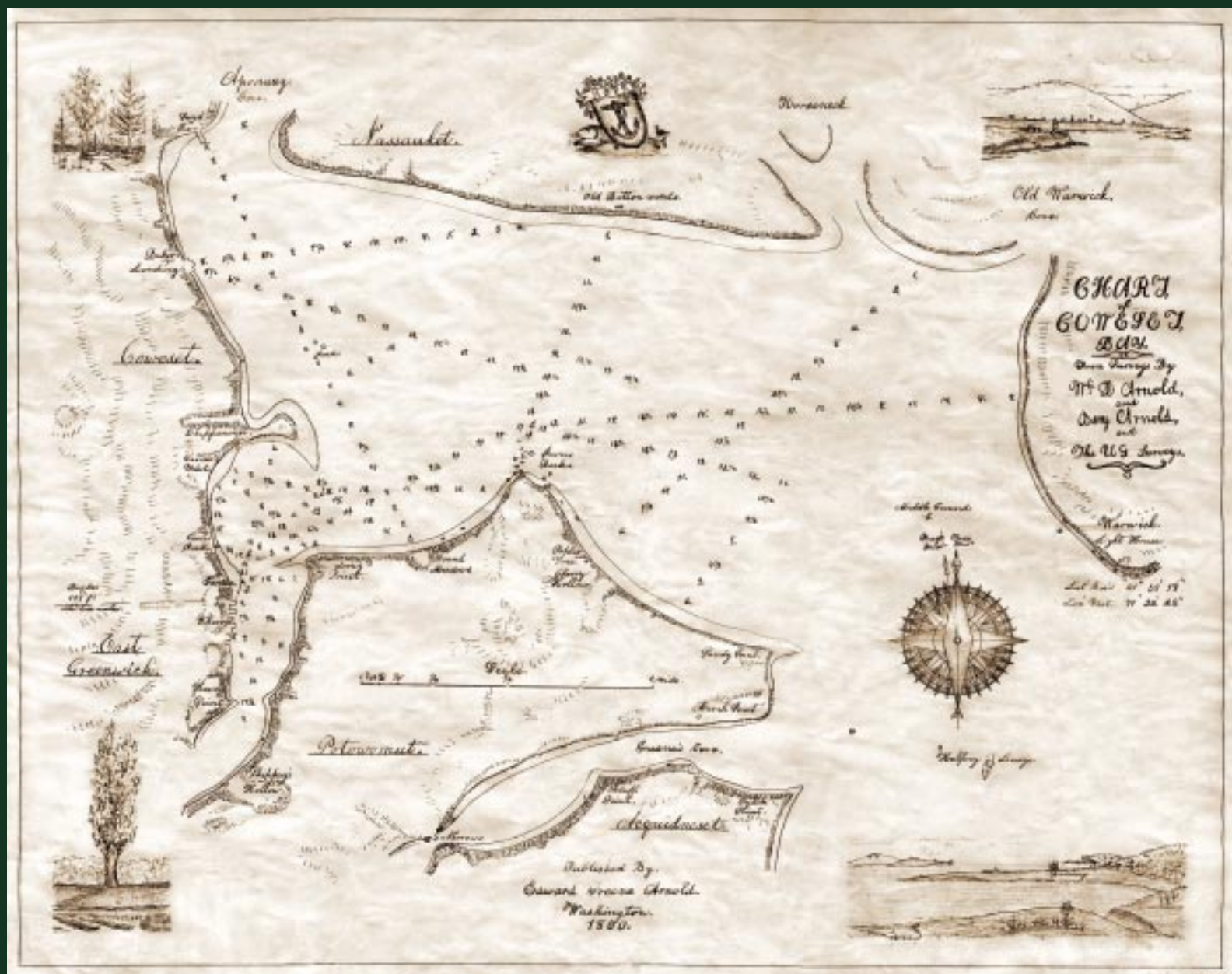
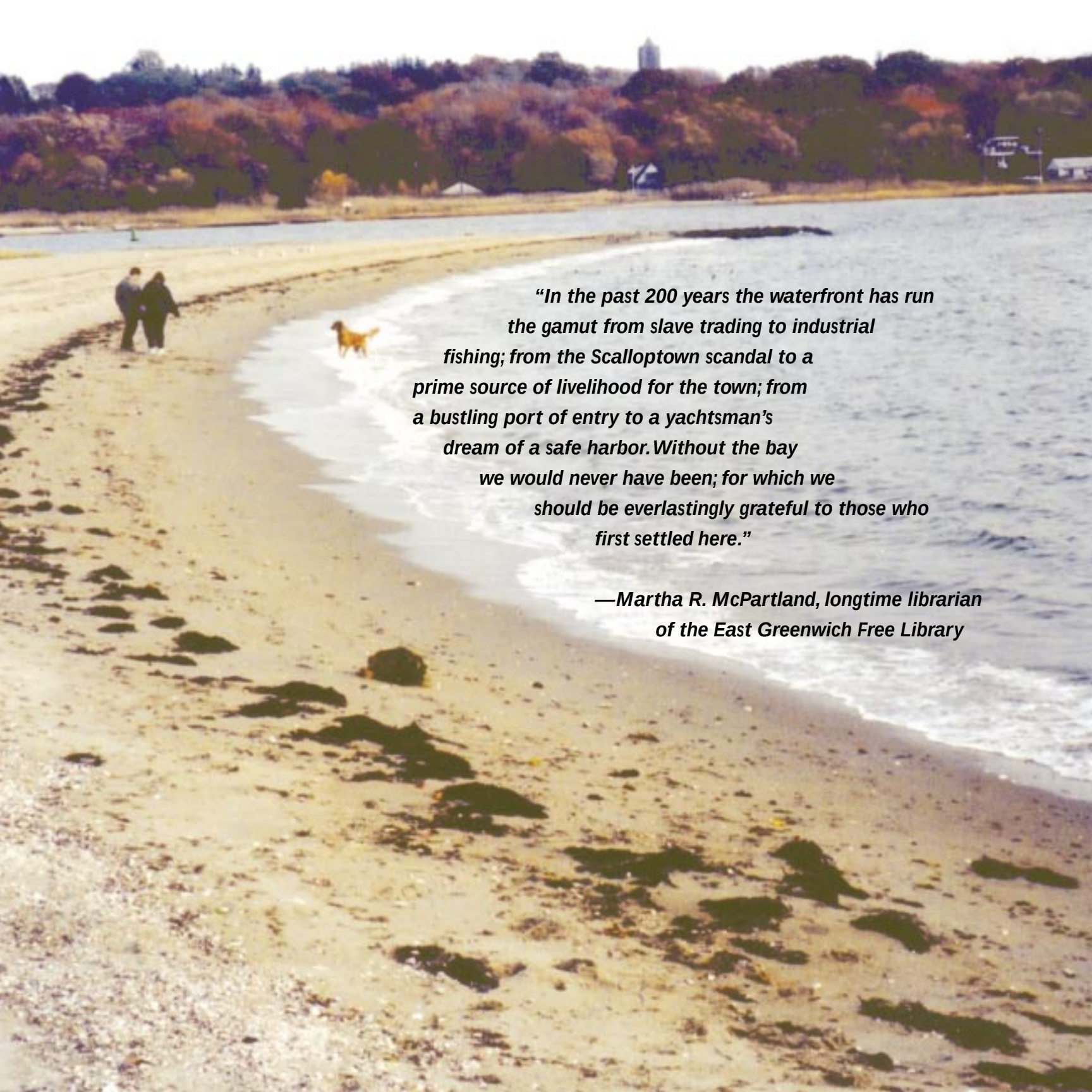


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Brushneck, Buttonwoods coves



“In the past 200 years the waterfront has run the gamut from slave trading to industrial fishing; from the Scallop town scandal to a prime source of livelihood for the town; from a bustling port of entry to a yachtsman’s dream of a safe harbor. Without the bay we would never have been; for which we should be everlastingly grateful to those who first settled here.”

—Martha R. McPartland, longtime librarian of the East Greenwich Free Library

Introduction

With five square miles of shallow water and five protected coves, Greenwich Bay is an estuary—a mixing basin for salt and fresh water—that has provided people with food, shelter, transportation, trade, and recreational opportunities for centuries. The waters that feed Greenwich Bay pass through a 26 square miles of watershed including parts of Warwick, East Greenwich, and, to a smaller degree, West Warwick. The area has long been home to industry and agriculture, not to mention thousands of residents.

This Book

Greenwich Bay: An Ecological History is designed to celebrate the best of Greenwich Bay, while examining the issues facing the bay. Chapters cover the theme areas of water quality, habitat, flood and storm hazards, geologic processes, cultural and historic resources, and land use and economy, which are illustrated by vignettes—personal anecdotes that provide a look at the issues through the eyes of an individual with ties to the bay.

Greenwich Bay History

In colonial times, seaport villages sprouted around bay coves as commerce and travel proved safer and quicker by sea than by rudimentary roads. These sheltered coves were also attractive for their access to fresh water, forest lumber, and seafood—especially shellfish. During the Industrial Age, families escaped city heat by flocking to resorts at Oakland Beach and Buttonwoods where community clambakes became a favorite summer activity. Although the popularity of Greenwich Bay resorts waned after the hurricanes of 1938 and 1954, the bay area emerged as a center for marinas, yacht clubs, restaurants, boat retail and repair services, and some of the most fertile shellfishing grounds on the East Coast.

Greenwich Bay Today

More people than ever are using Greenwich Bay for work and recreation, causing shellfishermen, recreational boaters, marina operators, environmentalists, and homeowners to compete for space. This increased use of the bay, along with residential and commercial development, has harmed bay waters with sewage discharge and stormwater runoff. The challenge persists to ensure that Greenwich Bay and its watershed remain a vital environmental, economic, recreational, and cultural resource for future generations.





Neighborhoods pull together to save bay resources and family traditions



Never underestimate the power of a Greenwich Bay neighborhood, says Jack Early, of the Defenders of Greenwich Bay, for these are the places where traditions of boating, clamming, and swimming run deep, and the will to protect them is strong.

The Defenders, a young non-profit organization, represents one of several neighborhood efforts to protect the Greenwich Bay environment for the benefit of residents. With members from neighborhoods such as Nausauket, Arnold's Neck, Chepiwanoxet, Buttonwoods, Potowomut, Apponaug, and Early's own Cedar Tree Point, the Defenders have come together to preserve shoreline pastimes.

The group coalesced around a contentious battle in 2002 against an expansion plan by the Greenwich Bay Marina. Supported by about 40 regular members, the Defenders convinced hundreds of residents to attend public hearings about the plan that was initially approved and is now the subject of a court appeal. Although grappling with advocacy issues, the Defenders say they have gained invaluable experience and insights that are shaping the group's goals.

"People have come to see the larger concern—that there is enormous stress on the bay, and we need, through science and other resources, to figure out what

the bay's threshold is for all the bad stuff that is being done to it. How much refuse can the bay process? To put it bluntly, how long before the bay throws up?" Early says.

The Defenders, with avid boaters among them, are concerned about boat pollution and its impacts on shellfishing and beach activity. "Goddard Park (beach) is closed more often, and the feeling is that we've lost the coves," says Early. "It used to be that children could play in the shallow waters of the bay, and you could hear their voices up and down the waterfronts. Now you hear, 'Take 'em out or they'll get sick.'"

Protecting the bay is no easy task, but Early says the neighborhood residents have the energy and desire to become active participants in serious efforts to save the resource. "Is it worth fighting for? Yes, because these are places with nice traditions—the beach bonfires on the Fourth of July, the children's Halloween parades, the sense of these former summer resorts sharing their community beaches—all you have to do is have a place off the street to park your car," says Early. "You bring your cooler and your rubber tire and you can enjoy the beach in Warwick—these are things people don't want to give up. This is our cause."

2: WATER QUALITY

After pollution forced the closure of Greenwich Bay to shellfishing in 1992, the contaminated beds became a stark symbol of the fragility of the bay habitat. Although cleanup efforts allowed the bay to partially reopen, pollution still impairs water quality. Storm-water runoff, leaking septic systems, and homes with sewage pipes illegally tied into storm drains introduce nutrients—nitrogen and phosphorus—and bacteria to the bay. The nutrients foster excessive growth of algae, which consumes oxygen from the water, making it difficult for certain bay species to survive. Meanwhile, pathogens, which may cause human illness, force closures of shellfish beds and beaches alike.

Manufacturing history leaves legacy of pollution in Greenwich Bay

The manufacturing mills built around Apponaug and Greenwich coves in the 1800s discharged untreated textile and metal waste and sewage into the bay. The surface of Apponaug Cove is said to have bubbled with red and yellow suds from mill chemicals. Anne Holst, a former R.I. Department of Environmental Management (RIDEM) conservation officer, notes that "kids in the 1930s and 1940s used to work (Greenwich) Cove for extra money, but they never knew what color the shellfish were going to be—it all depended on what color the Bleachery (a former East Greenwich fabric dyeing company) was using that day. They'd have to hose it all off."

Yet, the impacts of early industry on bay water paled in comparison to the later effects of suburban development. After World War II, returning soldiers took advantage of a federal bill that enabled them to buy new homes in suburban neighborhoods. The homes were often built on half-acre lots and discharged sewage that seeped into the water table and the bay. The problem worsened as summer cottages in Oakland Beach, Nausauket, Buttonwoods, and Potowomut, which were equipped to handle seasonal septic needs, became year-round homes. Automobile pollution also became a problem as rain washed increasing amounts of oil, chemical, and metal deposits off highways and parking lots into the bay.

Communities improve wastewater treatment facilities

Some early steps were taken by local governments to stop pollution, such as sewage, from entering the bay. Decades ago, East Greenwich and Warwick started sewerage portions of the watershed. The town of East Greenwich has diligently maintained the East Greenwich Wastewater Treatment Facility, which was built on the banks of Greenwich Cove in 1929. Shortly, the plant will introduce new technology to treat wastewater more safely and cleanly. In addition, a municipal \$6.5-million upgrade will implement third-stage (“tertiary”) treatment to remove nitrogen from wastewater. “We will have very, very strict discharge limits for nitrogen,” says Joseph Macari, facility superintendent. “I believe we will be the first facility in the state to use ultraviolet disinfection to kill all bacteria before discharging.” Presently, the facility treats 25 percent of East Greenwich homes and businesses. Upcoming sewer installations will potentially double the town’s treatment capacity.

Warwick’s sewage issues are different from those of East Greenwich. In Warwick, some septic systems discharge to the bay, but the city’s wastewater treatment facility, constructed in the early 1960s, discharges to the Pawtuxet River, outside the Greenwich Bay watershed. Therefore, when more residences tie into the sewer system, sewage discharge to Greenwich Bay will automatically decrease. With a \$137.5 million bond, the Warwick Sewer Authority (WSA) is installing sewer lines in neighborhoods along the bay, including Oakland Beach and Chepiwanoxet and portions of Warwick Neck, Buttonwoods, and Apponaug. Sewer pipes are available to about 70 percent of Warwick homes and almost all industrial properties, although many homes in the watershed have not hooked up to the sewers. Water quality in Greenwich Bay is expected to improve dramatically once all the businesses and homes in the watershed are hooked up to sewers.

Government, scientists, and businesses unite to clean bay

Immediately following the 1992 shellfish closure, an effort began to highlight the importance of improving wastewater treatment and to generate community support for cleaning the bay. Spearheaded in great part by then-Warwick Mayor Lincoln D. Chafee, the 1993 Greenwich Bay Initiative proclaimed it would “Bring Back the Bay” and





brought together government, business, academic, and community programs committed to improving bay water quality. A cadre of projects studied Greenwich Bay habitat, identified pollution sources and impacts, recommended potential solutions for restoring the environment, and addressed inadequate sewage disposal, storm-water runoff, and waste discharge from boats. The initiative played a significant role in convincing Warwick voters to support the bond issue for sewer projects.

A Rhode Island Sea Grant-sponsored research collaborative that was part of the initiative and was based at the University of Rhode Island (URI) gathered information about the impacts of pollution and storm water on the bay environment, with additional funding from the R.I. Aquafund Program and the city of Warwick. To assist the communities, researchers advised the WSA on priority areas for sewerage, and URI Cooperative Extension tested alternative septic systems for hard-to-sewer areas.

Also as part of the initiative, the R.I. Marine Trades Association (RIMTA) helped develop a program that taught marina employees and boaters clean boating practices. The program helped establish 11 boat pumpout facilities on the bay and created best management practices to address storm-water runoff, fuel station design, solid and fish waste disposal, chemical storage, petroleum control, and boat cleaning operations. RIMTA worked with RIDEM on a bill, passed in 1998, to make Rhode Island the first state to prohibit boaters from discharging sewage into marine waters. Still, the law relies on boaters largely to police themselves, an effort that tends to thin in busy summer months if lines at pumpout stations are long and equipment malfunctions.

In 1996, the U.S. Environmental Protection Agency praised the initiative for making progress toward “the goal ... to open the shellfishing beds unconditionally and to ensure that a sustainable yield shellfish management plan is in place to protect the bay in the future.”





*Greenwich Bay offers natural protection from the elements,
enabling fishermen to collect shellfish all winter long.*

Greenwich Cove is the “eighth wonder of the world” to shellfishing expert

Growing up on Greenwich Bay and “messing around with boats” is how Arthur Ganz, RIDEM supervising marine biologist, came to know and appreciate the bay’s prolific shellfish habitat. “It has a singular kind of geometry and geology that together make the bay an amazing place for growing and harvesting shellfish,” says Ganz. “People have done their best to mess the bay up, yet it’s still an incredibly productive place for shellfish, especially in Greenwich and Warwick coves. To me, Greenwich Cove is the eighth wonder of the world.”

Nutrient-rich freshwater inflows, abundant phytoplankton, bottom composition of sand and mud, salinity, shallow depths, and weather protection are key reasons why “big mounds of shellfish” grow at the mouths of bay tributaries, says Ganz, and populate the “classic clam flats” of Cedar Tree Point, Nausauket, Oakland Beach, and Buttonwoods. “The flats are very shallow—you can walk out 300 to 400 feet in some places and be surrounded by whole areas of soft-shell clams.”

Greenwich Bay offers natural protection from the elements, enabling fishermen to collect shellfish all winter long. “The bay allows you to get in out of the wind, and that’s important in the cold months,” says Ganz.

The soft-shell clam thrives in shallow intertidal zones, says Ganz, while oyster, which is pickier, prefers the low salinity and hard-rock bottoms of the upper end of

Greenwich Cove and the far reaches of the Potowomut River. The bay quahog ranges from the intertidal zone to depths of 40 feet or more and flourishes in well-aerated sand and mud bottoms, but quahogs are “hardy animals that are very resistant to anoxic conditions and can withstand pressures put on them,” Ganz says.

He knows firsthand that pollution, such as industrial chemicals, has affected the shellfish environment for decades. “I remember going to the Apponaug bridge when I was kid, and you’d see that whatever dye color the Apponaug Mill was using that day, that was the color of the water.”

To help keep the shellfish industry alive, Ganz, who has handled the state’s shellfish management program for 30 years, works on government transplant operations, such as in the photo on page 26, that enable shellfish to clean themselves of pollution. Efforts like this ensure that Narragansett Bay remains a leader in the regional shellfishing industry. Only Great South Bay of Long Island is producing quality shellfish at a similar level, says Ganz.

“The regional quality market really keeps an eye on Narragansett Bay shellfishing, and Greenwich Bay is critical to that.”

3: HABITAT

The Greenwich Bay estuarine habitat is legendary for supporting one of the richest shellfishing environments on the Northeast coast. When unacceptable water quality forced the state to close Greenwich Bay to shellfishing in 1992, restoration of this fishery became a pressing issue.

Shellfish feed by filtering phytoplankton, microscopic plants, from seawater. In a polluted environment like Greenwich Bay, shellfish also ingest bacteria from septic waste and storm water runoff, making the shellfish unsuitable for human consumption. Nutrients from the waste and runoff also fertilize fast-growing phytoplankton and seaweeds. The plants produce oxygen during the day, but use it at night for respiration and deplete most of the gas as they die and decompose. Deprived of oxygen, organisms on the bottom of the bay and in the water column cannot live or reproduce. Some animals adapt to the compromised habitat and survive, while other species either leave or die off.

Greenwich Bay is closed to shellfish harvesting following significant rainfall, and is open during dry periods. Still, the bay continues to support a thriving shellfish resource that plays a significant role in the Narragansett Bay winter quahog (hard-shell clam) fishery. Transplanting shellfish from the contaminated coves of Greenwich Bay to the clean waters of the West Passage of Narragansett Bay supports this fishery and restores local shellfish populations. Shellfish are transplanted so they can flush themselves of bacteria, grow, and be harvested for food. Collaborative shellfish transplant operations between the RIDEM and the R.I. Shellfishermen’s Association ensure shellfish stocks are available for market.





The 1938 Hurricane

Warwick endured the worst property damage in the state, losing more than 700 permanent residences and hundreds of summer homes.



Remembering the Hurricane of 1938

When the Hurricane of 1938 hit Greenwich Bay, Anne Crawford Allen Holst, a lifelong Warwick resident with deep ties to East Greenwich, recorded the natural disaster hourly. Holst, who was nationally recognized in the 1930s as a groundbreaking female firefighter and aviator, organized her own fire department in 1931 and was named fire warden for one-third of the state. Immediately after the hurricane, Holst flew along the shore of Narragansett Bay searching for signs of life and radioed reports to her fellow firefighters, or “smoke-eaters.”

Today, her daughter Anne Holst, another “first” lady—RIDEM’s first female conservation officer—owns Clouds Hill, a 29-acre Warwick estate on Greenwich Bay that served as her mother’s home base and is now a bed-and-breakfast and horse boarding farm. Holst grew up listening to the stories of her mother’s brave rescues during the hurricane, and inherited the journals that describe those experiences. “My mother loved to write. She kept a portable typewriter wherever she went, so that even when the power went out, she could still record her

thoughts,” says Holst. Below is an edited journal excerpt by Anne Crawford Allen Holst detailing her days during and after the Hurricane of 1938.

Cowesett, Rhode Island, September 21st, 1938 2:00 p.m: Lillie May calls up and says we are in for a very bad storm, and will I kindly come down with my trailer and take her boats up from the shore. I agree.

Chepiwanoxet, R.I. 3:00 p.m. The wind is blowing at least sixty miles an hour and the spray of salt, sand, and rain against our faces is terrific. It's all we can do to get the boats aboard the trailer. I wonder just what kind of a storm we are in for?

Cowesett, 3:15 p.m. Back at house I find the large ladder, as Arms was lowering it, (it) broke in the wind and fell on Arms' wrist, fracturing a bone. I take him into the house to give him First Aid, and the electric lights go off! The wind is increasing. Trees are going down. This must be what they call a hurricane!

4: FLOOD AND STORM HAZARDS

Greenwich Bay, like other coastal regions worldwide, is experiencing population growth and increased development in low-lying, flood-prone areas of the watershed and the shoreline. Flood and storm hazards, and community responses to them, impact the physical environment of the bay, but also shape how people live and work—especially how they build and protect homes and businesses.

Although people around Greenwich Bay have always suffered losses due to natural hazards, widespread storm destruction wasn’t felt until the manufacturing boom of the 20th century. For the first time, many wealthy merchants and factory owners from Providence, Warwick, and West Warwick built grand mansions and summer colonies along bay shores, while families boarded trolleys to cottage communities and amusement parks perched along the Greenwich Bay shoreline. Businesses, schools, and public buildings multiplied around the bay basin, supported by steadily growing, if vulnerable, networks of electrical lines, water pipes, and roadways.

The Hurricane of 1938, the worst hurricane ever to hit Rhode Island in modern times, caught the state completely unaware, killing 262 people. Hundred-mile-an-hour winds combined with a 15- to 20-foot-high storm surge and 30-foot-high waves, causing \$100 million worth of damage (in 1938 dollars). Because much of the area around Greenwich Bay is located in a floodplain, the coastal parts of Warwick and East Greenwich were subjected to flood tides measuring more than 13 feet above the normal high-water level. According to Warwick historian Donald D’Amato, Warwick endured the worst property damage in the state, losing more than 700 permanent residences and hundreds of summer homes. The hurricane also destroyed Rocky Point amusement park, a Warwick icon located on Narragansett Bay. Its loss was well documented and reports from the time demonstrate the fragility of such shoreline recreation areas to hazards. According to a Providence Journal Company publication, “Rocky Point, that Mecca of politicians and shore dinner consumers, fell like a house of cards before the southeast fury. The roller coaster was shattered, the great dining hall that could seat thousands was a soggy mass of lumber, a thousand bathing suits hung from the backwoods trees, and only the boilers stood where once a huge bath house had been. The oldest and most famous shore resort of the State was no more.”

East Greenwich's shellfishing community on Greenwich Cove was also pummeled by hurricane waves. "Scalloptown ... was reduced to a shambles by the turbulent waters. Boats and boathouses were tossed one upon the other by the force of the waves that reduced docks to kindling" (Providence Journal Company, 1938).

In 1954, Hurricane Carol deluged Rhode Island coastal communities, destroying \$3 million worth of property in Warwick alone. Six Warwick residents died; houses at Arnold's Neck, Chepiwanoxet, and Potowomut were destroyed; and the Apponaug Company literally floated away. In addition to the natural damage caused by the storm, stores and homes were looted, and the mayor of Warwick called on the National Guard to restore order.

Again, rebuilding took place, with each successive, largely storm-free decade bringing increasing development in flood zones around Greenwich Bay. Concentrated shoreline development has been vulnerable to weaker storms, such as 1991's Hurricane Bob, which inflicted \$115 million in state-wide property damage, eroded beaches, and ripped boats from moorings.

By the 1990s, government agencies developed disaster resistance plans to prepare for storms, and in 1997, Warwick was one of six New England communities selected to participate in the Federal Emergency Management Agency Project Impact national hazard mitigation program, which established public-private efforts that reduce disruption and loss. Warwick and East Greenwich are in the process of adopting hazard mitigation plans.



4:15 p.m. The 120-foot steel radio tower just came down! And the trees are going down like nine-pins. I just got the fire truck out of the station before a huge fir came down on the station. Bill's radio house has a big spruce down on it. And the wind seems to be increasing! Arms and I just tried to walk around the front of the house, and the wind knocked us both from our feet. The rain is straight salt water. I am soaked to the skin. And the moan of the hurricane — never will I forget this noise in all my whole life.

5:00 p.m. Oh God, is this never going to let up? It seems to get worse every minute. We haven't got a tree left standing around the house! And the huge, six-foot square granite block post on the portcouchere has been moved 1/4 inch on its foundations by this wind!

6:00 p.m. At last it seems to be dying down! Thank God, thank God! Anyway Arms and I are going to start to chop our way down to the Main Road, so we can get a car through, if there is anyplace left to go. The tide must be over the Main Road, because from here the Gaco Corp. seems to be entirely under water!

7:30 p.m. We reach the Main Road! I stop the first car we see coming. All roads are shut, blocked off by high tide and fallen trees. There is no communication, everything has gone out. I run Arms home first off as he is worried about his family. At Apponaug the Bay has come up over the Post Road and you cannot go through to Apponaug! I turn around and head back to the house. There, I get out the fire truck, and telling Nettie not to expect me back until she sees me, I head for East Greenwich.

8:00 p.m. Arriving in East Greenwich I find chaos. At the Fire Station, which seems to be headquarters, I find everybody in town. They are bringing in people from everywhere, injured and homeless. Scalloptown is wiped out. Potowomut, Sandy Point, Quonset Point, all the shore places are gone clean. The houses were washed away, carrying many to their deaths. Mr. Silverman asks me what to do. He cannot find anybody in charge of the Red Cross. I tell him to take charge. I am unloading the generator and starting it up. I flood-light the fire station. Heavens what that light means to these people. It seems to restore their morale. Never have I seen anything like it! I'll bet it's the only electric light on the west shore of the Bay, south of Providence.

8:30 p.m. Going into the telephone exchange I find them in almost total darkness, working feverishly. They have found one trunk line open to the outside world, and they are clear with Providence. By cutting over to the trunk line, they are keeping Providence in touch with the outside world! Little East Greenwich exchange! I rush a 200 watt floodlight into the exchange and floodlight the place. The girls heave a sigh of relief!

9:00 p.m. Vincent Grant, the exchange electrician tells me the telephone company's batteries are low, and that they may not be able to keep Providence in touch with the outside much longer. Have we got another generator? I think of Bill's 32 volt, 1720-watt generator and say yes. We rush a telephone truck up to the house and get it. Praise Allah it starts, with Bill's help. The day is saved, it is charging those batteries at a normal rate.

The 1938 Hurricane

Because much of the area around Greenwich Bay is located in a flood-plain, the coastal parts of Warwick and East Greenwich were subjected to flood tides measuring more than 13 feet above the normal high-water level.



Another day enters, Thursday, September 22nd, 1938 -

12:00 a.m. I tell Chief Miller I will leave the Cedar Hill Fire Truck with the East Greenwich Fire Company, in case anything starts, for the water has gone out of the mains—naturally, there being no electricity to run the pumps. God, what a catastrophe this is.

1:30 a.m. I rush home for a couple of hours' sleep, leaving the generators to Vincent's tender care. I set my alarm clock for 3:30 a.m., as I must be back at my generators by 4:00 a.m.

4:30 a.m. Finding everything O.K. with the generators, they're running smoothly, I beat it for the lunch-cart, and have a cup of coffee and two doughnuts. Pharnes stops in from his state truck. He says that all of the roads, state roads, are open to the one-lane traffic now. He worked all the early part of the night, carrying bodies in his truck, out of Sand Hill Cove. He says hundreds have lost their lives. Galilee, Charlestown, Matunuck, Quonochontaug, Misquamicut, Watch Hill, and Westerly

are all wiped out. He says downtown Providence is a shambles. They had to call in the militia to stop the looting.

9:00 a.m. I have no sense of time or date. Everything is timeless. All I know are those generators are running. Lillie May comes in uniform to report to me for Red Cross duty. Howard Asp and Clarence Duffy say they will look out for the generators for me. We go to the Armory where Red Cross headquarters have been set up. Mr. Budlong asks me to drive him south, so he can volunteer the help of the East Greenwich Red Cross to those who may need it.

12:30 p.m. In the Armory at East Greenwich, the scenes are indescribable. A mother, looking for her son—She and he were floating on a raft, at Quonset Point, when they hit a tree. The mother was thrown into the tree from the raft and spent the night there. The last she saw of her son he was floating to sea on the raft. —A single incidence.

4:00 p.m. Time goes on and on—and the generators are running. A small boy was just brought into the Armory, suffering from a concussion of the brain. Praise Allah, it is the mother-in-the-tree's son! A ray of light in all this darkness.

Saturday, September 24th, 1938. I reported at Red Cross National Headquarters in Providence for duty, and was assigned as Liaison Officer in South County. Sunday passed, and Monday, I spent the day working out of the wrecked Charlestown Airport in a Taylor Cub monoplane locating drowned bodies in the ponds and marshes. Tuesday I passed working in the Morgue at Charlestown. Wednesday, at the request of the Rhode Island State Police I took a crew and the portable pumper down to Quonochontaug to try washing away some sand in the search for bodies, that goes on, and on, and on—One full week has passed since this disaster. A week in which I have had but twenty hours sleep, and but damn little food. I am about exhausted. I have been on duty for the Red Cross 124 hours, and personally checked 45 persons for the Red Cross that have been listed as missing—searching Morgues, police lists, etc. If only there was some central organization running this instead of State Police, Fire Departments, Town Police Departments, WPA, CCC, and finally the Red Cross, not to mention the National Guard! The danger of another great disaster is becoming more and more apparent—that of sweeping Forest Fires. I am leaving the Red Cross Service to take up my work as State Forest Fire Warden. All I am wondering is where I am going to find the strength to continue on the job—

Anne Crawford Allen Holst







When shallow water is a deep problem

John Dickerson, owner of Apponaug Harbor Marina, can't help but think about dredging. The marina, built by his family on Arnold's Neck in Warwick more than 40 years ago, has prospered, but the increasing shallowness of Apponaug Cove poses a problem, according to Dickerson.

"Restoring the former depths is an issue for me, and it's not a new one," he says. "When it comes down to it, nobody ever really has enough water. We've worked with it; we've always brought in the smaller boats because of the fact we do have shallow water. But you see the problem all over—people have bigger boats now, the boats need more depth, and it's pressing the issue."

Photo left: Upper Warwick Cove

For now, Dickerson, who recently dredged a portion of his marina, continues to build his business. The marina has grown steadily over the years, as evidenced by Dickerson's yearly holiday cards featuring colorful aerial shots of the site, and will soon boast 348 slips generally made to handle smaller vessels.

Shrugging good-naturedly, Dickerson smiles when asked to predict the future of dredging in Greenwich Bay. "Well, I've been in this business a long time now, and I can tell you, this issue is just going to go on," he said. "It's not rocket science—the water's shallow and that cuts down how you can use it. But it's tough going. This is a highly regulated industry."

5: GEOLOGIC PROCESSES

How people live and work is determined in part by geography. The push and pull of geologic processes, such as beach erosion and deposition, have helped shape settlement patterns throughout the Greenwich Bay watershed.

Greenwich Bay's coastline is made up of rocky shoreline and sandy beaches, with four coves spread along the northern shore, and one cove on the southern shore. Much of the land that stretches away from the shoreline is a delta plain, including Potowomut Neck, which formed when water from a melting ice sheet deposited sediment into a glacial lake that is now occupied by Narragansett Bay. Hills and sharply elevated land in western and northern portions of the watershed are comprised of glacial till deposited beneath the ice sheet. In time, the glacial lake drained and lower sea levels exposed much of the bay bottom, allowing early peoples to forage the cold, forested land for food. As temperatures warmed, the ice sheet melted and receded north. Sea level rose dramatically, flooding the bay and drowning parts of the delta plain. A new environment of leafy forests and grassy fields resulted, enabling the first inhabitants, the Narragansett Indians, to farm in the area.

The bay's geology has provided the foundation for shipping, fishing, manufacturing, and recreation that has drawn people to the area for centuries. The bay continues to change with natural geological processes, however, and people have had to adapt to shifting geology. For example, in the late 1700s, the threat of erosion prompted East Greenwich to offer financial incentives to encourage people to build wharves.

Shifting shorelines threaten homes and businesses

Storm waves and elevated storm surges create erosion, which structurally harms homes and businesses, alters habitats, and washes away beaches. Efforts to address erosion at places such as Oakland Beach have met with limited success, leaving a wary bay community to nervously watch the changing coastline.

Sediment deposition has also created concerns, especially among marine businesses and boaters who say nature's continual shoaling of the bay floor complicates boat travel. Shoaling was not a problem in the late 1770s, when Warwick and East Greenwich coves were deep enough to host large cargo and passenger ships. According to a history



of the area, a large schooner “could tie up at (Greenwich Cove’s) Jail Wharf and some were so big that their bowsprits reached in as far as...the old Shore Mill (on King Street)” (McPartland, 1960).

Dredging is a controversial solution to deposition, erosion

Coves can be dredged, a seemingly simple proposition. According to Jon Boothroyd, Rhode Island’s state geologist and URI geosciences professor, dredging is about finding out where sand goes, going after that sand, and putting it back where it belongs. But the task requires many government partners to make sure the environment—at both the dredge site and the disposal site—is harmed as little as possible.

When a waterway is dredged, built-up material along the bottom of the passage is scooped out to deepen the channel and make it easier for boats to pass through. However, dredging may disturb habitats on the bay floor and stir up pollution. Furthermore, the more contaminated the dredge materials, the more difficult and costly it is to dispose of them properly.

Dredging has taken place in Warwick and Apponaug coves in the past, but some projects have been curtailed as the controversy over dredging impacts has intensified. In Greenwich Bay, government, business, and environmental advocates are discussing dredging plans for various coves. Some people hope that the dredging projects will yield clean sediment that can be used for local beach renourishment.

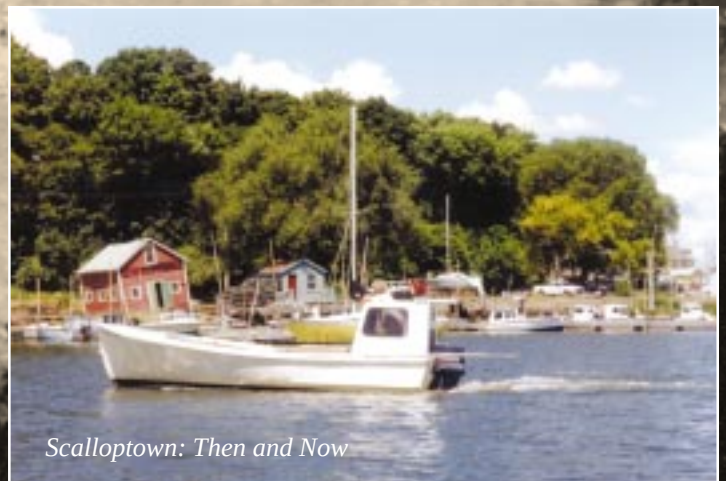
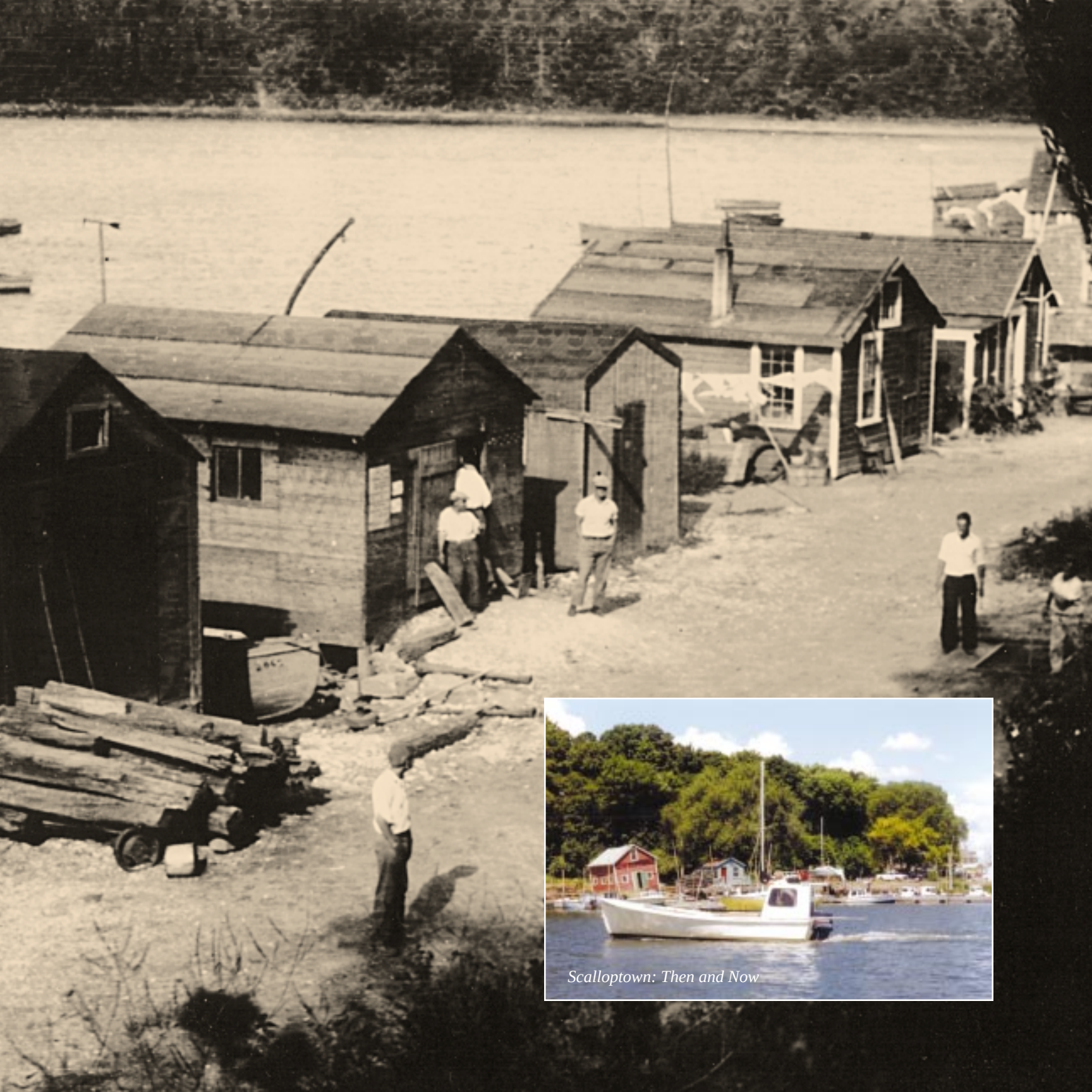


Potowomut



Baker's Creek





Scalloptown: Then and Now

Epitaph speaks volumes about the dangers of colonial lives

On a Saturday afternoon in November, the stretch of West Shore Road that brushes Warwick Cove hums with the sounds of a neighborhood reveling in unexpected warmth. Skateboarding boys exchange boisterous dares that echo off the local Elks Lodge and compete with slamming car doors that signal steady attendance at the yard sale across the street. Gearshifting trucks and revving motorcycles sometimes obliterate all other sounds on the roadway.

Yet, less than a quarter of a mile from the curb lies R.I. Historic Cemetery #28, a graveyard hidden from sight by thickets of brush and hushed of sound by blankets of leaves. The worn gravestones belong to English families who settled along the north shore of Greenwich Bay and built Warwick's first colonial community. Of the several farmhouses that Warwick founder Samuel Gorton and his followers built here, perhaps the most famous was the Stone Castle of 1649, the only house in the settlement built completely of rock.

Gorton's farming community was ambivalent about its relationship to neighboring Indian tribes. The colonists' struggles were sometimes captured in graphic gravestone epitaphs. One belongs to John Wickes, a colonist who met a gruesome end in 1676 as he and a small band of Warwick settlers fought off an Indian attack during King Phillip's War. According to the R.I. Historical Preservation Commission, Wickes met his end when he "imprudently left the protection of the (Stone) Castle" and suffered decapitation. The tombstone for the grave where his head and body rest separately in the Stone Castle graveyard reads:

1609 – 17 Mar 1676

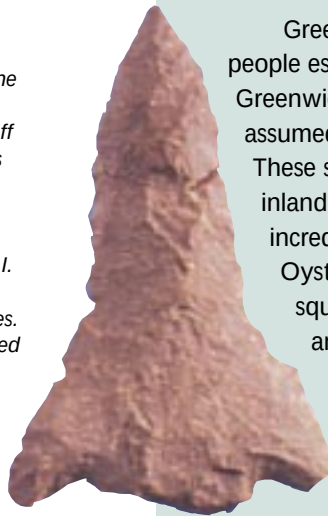
JOHN WICKES

b. (born) Staines England, came to
New England 1635.

An original purchaser of Warwick 1643.

'In King Phillips War after the town was burnt, on
going out from Thomas Green's stone castle to look
for his cattle on 17 March 1676 he was slain by
Indians and his head set on a pole.'

Erected by Benjamin Greene Arnold 1881.



6: CULTURAL AND HISTORIC RESOURCES

Greenwich Bay has a rich cultural and historic heritage. Indian people established fairly permanent year-round settlements at Greenwich Bay after the rate of sea level rise slowed and the bay assumed its modern form by approximately 3,000 years ago.

These settlements focused on the coastal edge but also spread inland along the waterways. The people prospered from the incredible variety and abundance of wild plants and animals: Oyster, soft-shelled clam and quahog, white-tailed deer, squirrel, rabbit, bear, weakfish, tautog, turkey, hickory nuts, and acorns were easily obtained in the Greenwich Bay area.

Archaeological evidence from Greenwich Cove suggests that the richness of the environment made it possible for people to live well without the benefit of domestic plants such as maize, at least until shortly before contact with Europeans in the 17th century. When Roger Williams established a trading post at Wickford in the 1630s, the Narragansetts were the dominant political force in the area, with strong social and political ties.

History of Warwick, East Greenwich shaped by war

Warwick founder Samuel Gorton, an English clothier with fervent beliefs about freedom from religious and political systems, fought with town leaders and was banished from Plymouth, Mass., and Portsmouth, Providence, and Pawtuxet before he and a group of comrades bought more than 100 square miles of land—Shawomet—from a branch of the Narragansetts. Gorton convinced English royalty to approve his purchase, and he named his settlement "Warwick" in deference to the earl who granted the official charter in 1647. Yet Gorton and his followers encountered trouble after they built Old Warwick Village at the head of Warwick Cove.

In 1675 a bloody battle for land began that pitted colonists against Indian tribes. The war ended in 1676 with the murder of Wampanoag leader Metacom, known to the English colonists as King Philip. Many Indians were subsequently forced into exile or slavery. After the massacre of King Philip's War, Apponaug Village became Warwick's hub and thrived as a government and military center, shipping port, and mill location.



In 1677, the R.I. General Assembly gave land to 48 soldiers who had fought King Philip's War, forming the town of East Greenwich. Ironically, most of the men chose not to settle in East Greenwich, but rather in Newport, Portsmouth, and Jamestown, deeding their grants to younger members of their families.

Eventually, East Greenwich's natural

attributes attracted shipbuilding, fishing, and textile operations, which fostered the town's development as a political and military center. In 1750, East Greenwich served as a seat of Rhode Island's colonial government. The town provided elite soldiers, the Kentish Guards, who fought in the Revolutionary War and built a key stronghold—Fort Daniel—at the entrance to Greenwich Cove.

One of the country's first aircraft factories, Gallaudet Aircraft Corporation, located on Greenwich Bay, was known during World War I for its mass-produced Curtiss floatplanes. The company, a precursor to behemoth defense contractor General Dynamics, found the bay a sheltered place to test and launch seaplanes. Flying planes over the bay had its unpredictable moments, and airplane designer John G. Lee recalls in his memoir the day a plane takeoff had to be canceled. "Somebody began waving frantically at the road. The mechanic saw him and cut the master switch. It seems a group of little sailboats, which were moored off-shore, had all capsized from the (plane's) slip stream!" Though the Hurricane of 1938 destroyed the company's buildings, and no remnants remain, Warwick's recent purchase of 10 acres of property on Chepiwanoxet Point preserved the site as well as saved valuable open space on the bay.

The era following World War II has shaped the way people live in Warwick and East Greenwich today. The

Environment was natural classroom for Narragansetts

For a Narragansett Indian child growing up on Greenwich Bay hundreds or thousands of years ago, the environment was a natural classroom brimming with opportunity and challenge. "Survival was your education," says Ella Sekatau, ethnohistorian and elder medicine woman of the Narragansett Indian Tribe.

Once a child had lived to the age of three, he or she was officially recognized as a member of the tribe and ushered into a world where physical and mental growth was fostered in formal education, work, and play. "When the children would play, the games and contests that were taught to them were designed to encourage them to excel. It was who could run the fastest, who could swim the fastest, who could do the most work, who could catch the most fish. These were games that taught these children how to survive," Sekatau says.

The Narragansett Indians who lived in the Greenwich Bay area spent the summers in bayside campsites where they harvested fish and shellfish. They also hunted, freshwater fished, and grew crops such as corn. In the winter, the tribe moved inland to escape the brunt of bad weather, with matriarchal families living and working in wooden longhouses covered with tree bark and insulated with cattail mats and other vegetation.

In all seasons, children learned the

work techniques and arts of their elders, and were given responsibilities early on that confirmed their place and value in the family and the tribe. "In the summer, when you were four years old, you'd be placed on corn watch, and your job was to keep the birds and animals away from the crop," says Sekatau. "Think back to this time—there were a lot of animals around, which is why the Narragansetts placed brush fences around their crops. So if you were a child assigned to corn watch, you had to watch out for deer—both elk and moose—bears, raccoons, foxes, and coyotes."

Children grew up in the footsteps of their parents, with girls learning how to care for the land, raise children, and maintain campsites. Boys followed their fathers and learned trading, hunting, and fishing, as well as how to build the tribe's winter longhouses and summer round-houses.

Before the introduction of debilitating European diseases such as tuberculosis and measles, Narragansett youth could expect to live long lives, and Sekatau claims many Indians lived past 100 years. "These people had longevity, and it was because of the way they ate, the way they worked, the way they lived," says Sekatau.





suburbs that sprang up in that time—thanks to the G.I. Bill that made homeownership available to returning soldiers—make up the bulk of residences in the Greenwich Bay area.

Scaloptown known for more than shellfish

East Greenwich emerged in the late 1870s as Rhode Island's leader in scallop production. Shellfishing boomed between 1890 and 1913, and Greenwich Cove's legendary "Scaloptown" generated its fair share of colorful stories even as it produced astounding shellfish catches. Shacks built on piles along the waterfront were havens for fights, prostitution, and even murders, according to legend. Overfishing, pollution, and public concern about the safety of crime-ridden wharf areas brought about the decline of Scaloptown after its peak in the 1930s. Today, Scaloptown legends are still passed on by modern-day shellfishermen, who gather in poor weather at a Greenwich Cove fishing shanty to swap stories and industry information.

Local people still claim close ties to shellfishing, evidenced by the quahogger statue—complete with a bandana-collared, seafaring dog—gracing the front of the recently renovated Warwick Public Library.

Bay shores serve up supper and swimming

Recreation has always beckoned people to the bay. In the early 1800s, an abandoned brig at Arnold's Wharf served as a bathing house and diving board for local children.

Travelers came by steamboat or by wagon from the Apponaug Train Depot to the beaches on the Warwick shoreline. In the 1830s, the earliest commercial clambakes, which have become a New England tradition, were born in what is now the Buttonwoods Beach Historic District. According to the Providence Journal, a clambake held in Old Buttonwoods on July 4, 1840, drew record numbers: "Fully ten thousand people were in attendance and two hundred bushels of clams, one hundred and thirty bushels of quahogs, twenty barrels of chowder comprised the menu." Buttonwoods Beach is one of several historic districts in the Greenwich Bay watershed in the National Register of Historic Places.



Preserving open space saves pieces of history

Goddard Park, a nearly 500-acre public park of state and national significance, is renowned not only for its recreational amenities on Potowomut but also for its history. According to the R.I. Division of Parks & Recreation website, the park was originally Narragansett Indian farming and fishing territory. The land fell into colonists' hands in 1684, passed to descendants such as Tory sympathizer "King Richard" Greene, and eventually served as a private estate for Rhode Island's famous Brown, Ives, and Goddard families. Forest care was a pet concern of many family members, including Goddard clan member Henry C. Russell who, "when walking about the grounds ... would fill his pockets with acorns and plant them in holes punched with his cane. Three acorns were planted for each oak ... one for the squirrels, one for the worms, and one to grow." Goddard descendants eventually donated the land to Rhode Island, stipulating the implementation of a permanent forestation program.

The tie between local people and historic and cultural resources is further reflected in community projects such as the construction of a replica of the historic Oakland Beach carousel, a symbol of the beloved and long-gone seashore resort. The challenge for the people of Greenwich Bay is to find a compromise between the preservation of historic and cultural resources—including the bay itself—and the pursuit of economic opportunities to ensure a viable community for tomorrow.



Coast Guard officer shares cultural beacon with the public

U.S. Coast Guard Commander Thomas Jones, of the Coast Guard's civil engineering unit in Warwick, is the current resident of the Warwick Neck Lighthouse, which commands a panoramic view of the mouth of Greenwich Bay from its position at the southernmost tip of the peninsula.

"I've found it to be a great experience, and so has my family," says Jones of being a lighthouse keeper. Speaking in front of the looming lighthouse on an autumn Saturday morning, Jones reflects on his family's good fortune at his post: "My daughter may be a little too young to fully comprehend the surroundings we have now, but I think she'll have some good memories about it."

Allowing others to bask in the scenic beauty of the lighthouse site—the green-shuttered clapboard house, the sloping expanse of lawn, the beacon rising above cliffs and spray—has become a bit of a personal pastime for Jones, who gamely waves curious, often excited, onlookers through the opened chain link gate at the top of the driveway and down to the lighthouse.

Today is no different. "Sure, come on down!" calls Jones, prompting five camera-toting tourists from Washington, D.C., to eagerly approach the lighthouse. Gathering around Jones, the little group receives an impromptu tour of the site, snapping shots of the lighthouse against the backdrop of the bay. "Wow, this was worth the ride out," murmurs one

man, craning his neck skyward to take in the top of the structure.

It's a sentiment felt by many visitors to the Warwick Neck Lighthouse. The lighthouse was built at the mouth of Greenwich Bay in 1826 to mark the passage between the point at Warwick Neck and the northern part of Patience Island. Rebuilt in 1889 and 1932, the lighthouse had to be moved inland after the Hurricane of 1938 left it balanced precariously on the eroded bank of the Neck. With huge jacks, the beacon was hoisted onto logs and rolled 50 feet inland to its current location.

Like the other officers who have watched over this treasured light, Jones, who hails from Virginia, knows his family will one day vacate their keeper digs for a new destination and tour of duty. That's just the way of the Coast Guard, indicates Jones, with a good-natured shrug.

Still, he's proud to call the beacon site home for now, and content to share the prominent Greenwich Bay landmark with the community. "People are interested in seeing the bay and the view from here, and I'm happy to help them experience it," he says. "It's quite a place."





L and-use patterns and economies of the Greenwich Bay watershed are the products of people's interactions with the bay and their dependence on its resources.



Public access to Greenwich Bay

Access to the shore is an essential part of the heritage of the people of the Ocean State. The Rhode Island Constitution specifically protects citizens' rights to fish from the shore, to gather seaweed, to leave the shore to swim in the sea, and to walk along the shore. In Rhode Island, state waters of public domain extend from mean high water three miles out to sea. Above mean high water, land and resources can be, and often are, privately owned.

There are numerous rights-of-way to the shoreline of Greenwich Bay. In addition to state and municipal beaches and parks, there are many other points along the shoreline where the public may view, fish, boat, or swim the waters of Greenwich Bay, including grassy paths, streets

ending at the shoreline, boat ramps, and boardwalks.



7: LAND USE AND ECONOMY

Land-use patterns and economies of the Greenwich Bay watershed are the products of people's interactions with the bay and their dependence on its resources. The Narragansett Indians coined shell money, or wampum, and used the currency to buy goods such as metals and stone from other North American tribes. "The Narragansett Indians would primarily barter or trade for items, but when you didn't have anything to barter or trade, that's when the shell money was brought in," says Sekatau.

Basic needs for food and safe water travel drove Indians and European settlers alike to live and farm near the bay, and the Narragansetts played a major role in shaping colonial settlements in the 1600s. Colonists secured land from the Indians, but the transactions were typically fraught with mistrust, and uneasy alliances were complicated by inner fractures within tribes and settler groups. Tensions between the Indians and the settlers ebbed and flowed, but worsened as the Narragansetts lost more land and environmental assets. The colonists, says Sekatau, failed to respect the tribes' ecological practices that were critical for maintaining environmental balance in the bay area. "They could not understand the undergrowth burning, the practices of planting crops, or the benefits of not defiling the waters. The colonists did not understand that the moving of habitats periodically placed minimum demands on the ecosystems ... The colonists had a different understanding of labor and wealth," and thus, "the goal was to make the areas look like what they had left behind in Europe," Sekatau says.

After King Philip's War, when the land that became East Greenwich was deeded to soldiers who had fought in the war, the R.I. General Assembly recognized the need to settle new communities in close proximity to the bay, and encouraged their development, complete with "convenient highways" (McPartland, 1960). In time, waterfront villages grew as shipping, shellfishing, and manufacturing industries created jobs and a niche for bay communities in the world market.

Together, shipping, including the slave trade, travel, shellfishing, and manufacturing, accelerated growth of bustling bayside villages from the late 1700s through the early 1900s. The East Greenwich waterfront along Greenwich Cove "was the scene of much activity then, wagons rattling down King Street loaded with all sorts of

freight; messengers a-foot speeding to reach the captain and hand him messages to be delivered (often in person); carriages with packet passengers dressed in their finery for the occasion” (McPartland, 1960).

Federal embargoes, the War of 1812, and the arrival of the railroad dampened business at the shipping ports, but textile manufacturing and shellfishing prospered from the late 1770s through the early 1900s. Tanneries, clothmakers, fulling mills, fabric printers, cotton mills, and shipbuilders were among the manufacturing firms that grew in East Greenwich and Warwick and provided jobs for residents, including immigrants from Ireland, Sweden, and Italy. “The situation is healthy and pretty—good for help and cheap for living and as fine a location as any other for Steam Cotton Mills,” wrote textile proprietor Edward D. Bolt, lauding Apponaug as an ideal location for a print works operation in the mid-1800s (D’Amato, 1992).

Until Prohibition was repealed in 1933, liquor-smuggling aboard ships such as the notoriously evasive East Greenwich-based *Black Duck* made fortunes for bootleggers. As waterfront businesses—from shellfishing to smuggling—declined, manufacturing grew to drive the economy in East Greenwich and Warwick, increasing land use. Large-scale consumption of land for residential and commercial expansion escalated significantly after World War II. This slow but steady conversion of commercial and subsistence farms to post-war suburban neighborhoods yielded patchwork development that prompted local governments to create zoning laws. While fledgling ordinances addressed development in new residential and business areas, they did little to protect older villages, shorelines, and farmland.

Glaring zoning failures were not lost upon the community. An article in a 1941 edition of the *Providence Evening Bulletin* describes the impact of mismatched land uses: “Officially, Warwick is a city (but) it has not quite made up its mind whether to become a full-fledged city or remain the half country town and half city it is today. Except for the parts immediately bordering Cranston, Warwick usually presents a picture of a fully developed settlement on one side of the



“Young blood” and smart partnerships are keys to bay economic vitality

“I recently had an epiphany,” muses Michael McGiveney, president of the R.I. Shellfishermen’s Association (RISA), a warm smile spreading slowly across his bearded face. “I was breaking up the ice on my way out of the harbor, and before I know it, I’m humming that song, “Stir It Up,” and I watched this incredible sunrise, and it was just the best feeling. I know all over again why I fell in love with this.”

Shellfishing is in McGiveney’s blood. His shellfishing grandparents proudly provided a scallopboat display to the Chicago World’s Fair in 1893, and his uncle, a shellfishing union representative, introduced him to the business more than 20 years ago.

McGiveney spent his youth living on the Warwick-East Greenwich line, buying his first shellfishing boat at age 12 with his paper route money. He quickly developed a flair for shellfishing, reveling in the physical demands of the job, the beauty of the environment, the good-natured camaraderie of competing fishermen, and the steady flow of money that rewarded him for his catches.

The URI political science major earned good grades that beckoned him to consider a law career, but McGiveney couldn’t quite give up his childhood fascination with shellfishing. “My professors weren’t even making what I made,” he says, laughing. “Hey—quahogging was good business.

And I’d always been a hard worker and I loved being my own boss. I realized that this was what I wanted to do. It was what I had to do.”

McGiveney worked hard, and he and his wife eventually built a home in Coventry where they now raise their young family.

Newspaper clippings spread across his kitchen table recall the precarious time in 1992 when the state imposed a Greenwich Bay shellfish ban after a major winter storm washed crippling amounts of pollution from failing septic systems and roadways into the water.

The closeout initially prompted waves of fear and anger, says McGiveney. The local industry suffered \$1 million in losses, and hundreds of fishermen reluctantly abandoned their jobs for work that could feed families and pay mounting bills. The collapse of the industry also sent boat repair, dock, mooring, and engine businesses scurrying for customers.

Watching friends leave the profession was hard, but McGiveney told himself throughout the ordeal that there would be ways to help the local shellfishermen and the bay get back on track. With his background in policy and law, McGiveney found himself increasingly involved in the politics of the industry, becoming a practiced lobbyist and finally, RISA president in 1995.

Though post-1992 Greenwich Bay couldn't continue to support 3,000 shellfishermen, the resource has steadily supported 1,200 licensed shellfishermen, of whom about 300 to 400 are regularly active, says McGiveney: "I think there's good work going on to maintain Greenwich Bay as a stable resource." He lauds a RIDEM program that has, with RISA assistance, transferred healthy young shellfish to clean beds in the bay. And he is hopeful that the local industry will continue to foster dialogues with aquaculture interests in the state, including seeding initiatives stemming from Roger Williams University.

Today, McGiveney says, the local industry faces the challenges of bringing in "young blood" to curtail what he wryly describes as "the graying of the bay," and developing new technologies and partnerships that will support transplant and seeding projects. Both are doable, he says, and both are necessary. "We must—and I think we can—maintain a stable and healthy environment in Greenwich Bay that can support resources such as shellfish," says McGiveney. "If we can support the resource, then we're going to be able to grow the industry, bring new blood in, and strengthen the commercial fabric that has grown up around shellfishing."



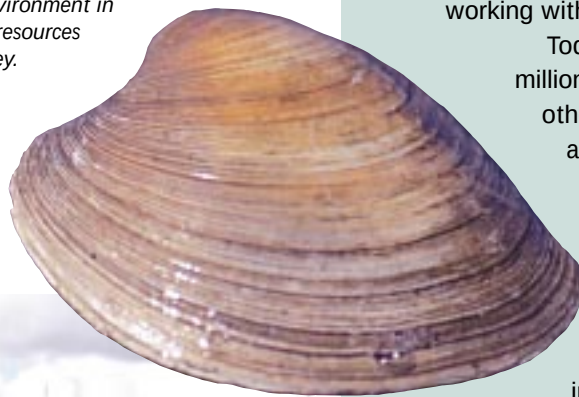
street and a dairy farm or market garden on the other. The dreams of many a city worker are interrupted in the early morning by the crowing of roosters and the lowing of cows" (R.I. Historic Preservation Commission, 1981).

Today, East Greenwich and Warwick have taken steps to be more selective in assigning land uses and choosing development projects. Municipal planning and

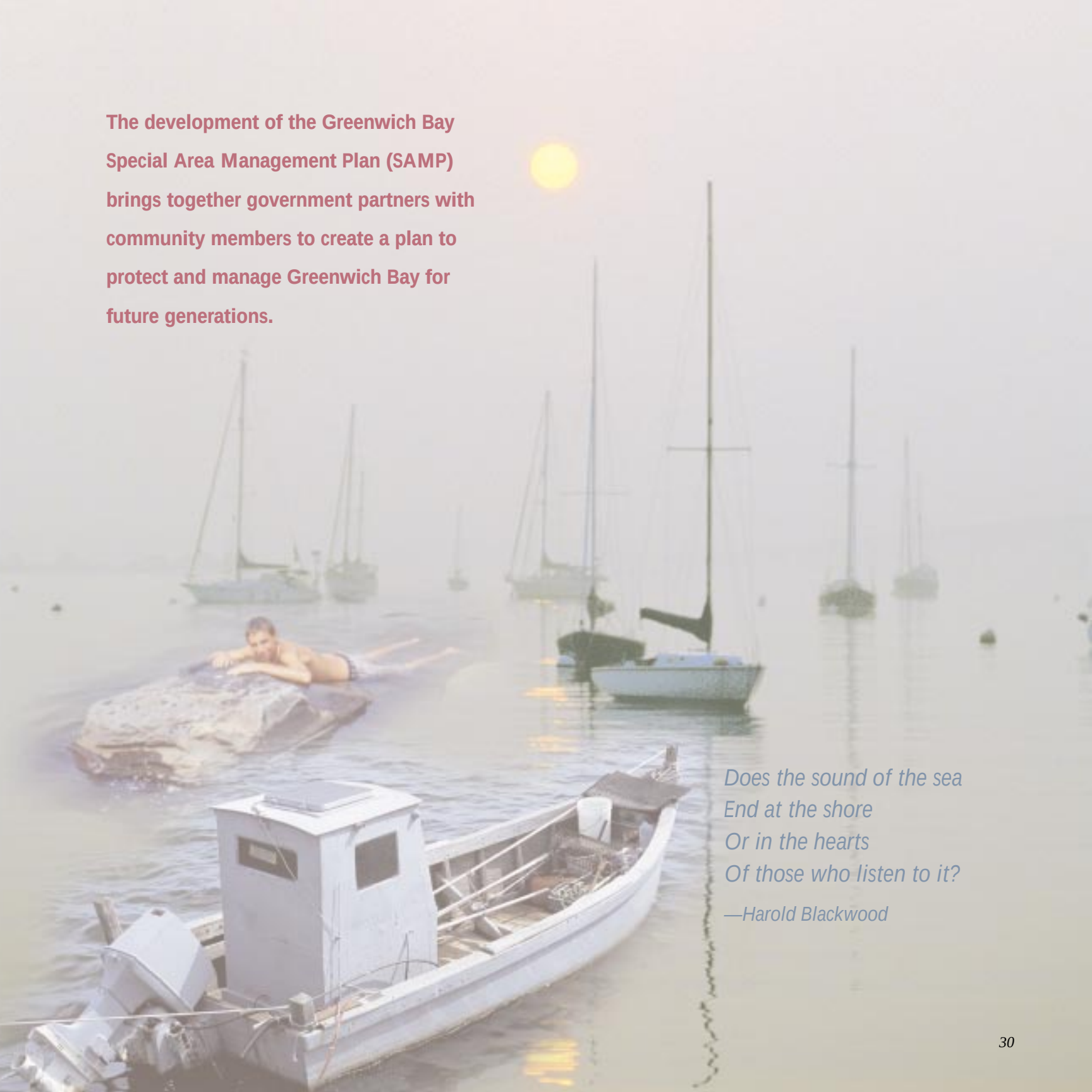
zoning boards participate in training workshops so they can learn how to use new planning tools and help elected officials make informed decisions.

The communities have also invested in open-space purchases. Between 1994 and 2001, Warwick partnered with government agencies and private organizations to allocate more than \$5 million to seven open-space purchases totaling 247 acres. In East Greenwich, the local land trust has helped protect nearly 300 acres since 1987, working with the town on public-private efforts.

Today, Greenwich Bay shellfishing contributes roughly \$4 million annually to Rhode Island's economy. Marinas and other marine-based businesses along Greenwich Bay are also significant economic contributors. Keeping these businesses thriving is important not only to the business community but also to Warwick, East Greenwich, and the state. Government leaders are working to balance economic vitality, community development, and natural resource protection for Greenwich Bay. Elements include marine-based industries such as recreational boating and fishing, waterfront tourism, boat building and outfitting, shipbuilding, fishing, aquaculture, and marine transportation. The R.I. Economic Policy Council is promoting the long-term, responsible use of Narragansett Bay resources, and the state Senate and House policy offices are working together to help local communities build a marine business cluster that creates jobs and revenues while protecting natural resources.



The development of the Greenwich Bay Special Area Management Plan (SAMP) brings together government partners with community members to create a plan to protect and manage Greenwich Bay for future generations.



*Does the sound of the sea
End at the shore
Or in the hearts
Of those who listen to it?
—Harold Blackwood*



8: Special Area Management Planning

Community involvement and partnerships between state and local governments are the cornerstones of SAMPs. CRMC is undertaking the Greenwich Bay SAMP with the town of East Greenwich and the city of Warwick. Partners include RIDEM, the R.I. Department of Health, the R.I. Economic Development Corporation, the Warwick Sewer Authority, RIMTA, RISA, Save The Bay, the Natural Resources Conservation Service, and the Southern Rhode Island Conservation District.

The goal of the partnership is to develop a management plan for Greenwich Bay that reflects community input, considers watershed boundaries rather than municipal ones, and recommends protection actions that can be undertaken through a collaborative government effort. Policies recommended by the SAMP for improved management of Greenwich Bay are expected to be adopted into the state's Coastal Resources Management Plan and watershed management policies, as well as municipal comprehensive plans and harbor management plans.

With the support of the R.I. General Assembly, CRMC secured a federal grant in 2002 to oversee the creation of the Greenwich Bay SAMP. Rhode Island Sea Grant/CRC, which has developed several SAMPs for CRMC since 1980, is conducting the SAMP with assistance from local, state, and federal agencies and other organizations.

A fish kill in Greenwich Bay in August 2003 due to a lack of oxygen in the water underscored the importance of addressing the myriad factors affecting water quality in the bay.

Michael Tikoian, CRMC Chairman
Grover Fugate, CRMC Executive Director
CRMC is the state regulatory and management agency responsible for preservation, protection, development, and restoration of the coastal areas of Rhode Island, and for designating rights-of-way to the coast.
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The challenge is to find a compromise between the preservation of historic and cultural resources—including the bay itself—and the pursuit of economic opportunities to ensure a viable community for tomorrow.



